

ASD Weekly Highlights for the Week Ending 26-May-2006

Operations

- Running Beam for Target/Accelerator Physics/RF Processing
- Planning for the June/August Shutdown, meeting today at 3:00
- Reviewing the Bypass System and how it is being used
- Working on the Project Completion Report
- Continuing to load equipment tracking data into Datastream, focusing on the CECs Chipmunks and ODH for Protection Systems Level 2 work.
- Planning for Operations to take over set-up/tuning/operation of the LINAC in the next run period.
- Interviewing this week for the Operability/Maintenance Coordinator

Weekly Report for Week Ending 26-May-06

From 20-MAY-2006 to 26-MAY-2006

Recorded Activity Type	Hours	Percent of Total
Beam Time (delivered to Target)	63.60	37.86
Machine Startup (from a Planned Shutdown)	3.10	1.85
Machine Studies (R&D)	17.30	10.30
Planned Shutdown (no Beam, no Testing)	21.00	12.50
Testing (Machine on, no Beam, e.g. RF Processing)	15.30	9.11
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Total Activity Recorded	120.30	
Total Downtime Recorded	47.70	42.86
Total	168.00	

Equipment Breakdown by Group, SubGroup and Sub_SubGroup

Group	SubGroup	Sub-SubGroup	Hours	% Breakdown
Vacuum	Vacuum Valves		.10	.21
Vacuum	Vacuum Valves	Fast Valve	.20	.42
Vacuum	Vacuum Diagnostics	Vacuum Gauges	2.50	5.24
Controls	Network and Computing - ICS		8.10	16.98
RF Systems	Cavities and Structures		4.50	9.43
RF Systems	LLRF - Low Level RF Systems		.30	.63

RF Systems	HPRF - High Power RF Systems		3.50	7.34
Diagnostics	BLM - Beam loss monitor	IOC	2.00	4.19
Electrical Systems	LEBT Chopper		1.00	2.10
Electrical Systems	MEBT Chopper		.50	1.05
Electrical Systems	Power Supplies		2.70	5.66
Electrical Systems	AC Power Distribution	Motor Starter	6.40	13.42
Electrical Systems	HVCM		3.00	6.29
Protection Systems	Service Bay Evacuation Alarm		.50	1.05
Machine Protection System	Fast Protect - Latched		.20	.42
Facilities - Site Operations	Compressed Air		4.70	9.85
Cooling Systems	DI	Controls	1.70	3.56
Cooling Systems	DI	Instruments	3.10	6.50
Cooling Systems	QMCS		.50	1.05
Cooling Systems	RFQ Chiller		2.20	4.61

Accelerator Physics

RF Systems

Ring RF

Assembling Low Level RF Test/Development Station in our lab.

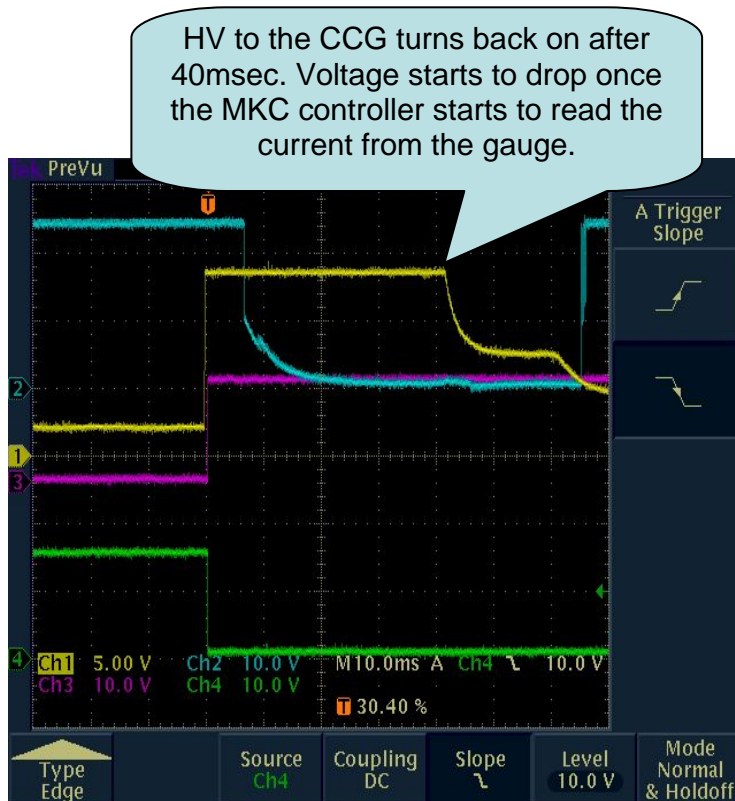
Ion Source

Instrumentation and Controls

- As the control system supported operations this week, a number of problems arose and were addressed. Three major issues and their resolutions are described below. Most severe was a fault related to the ODH system.
- ODH Annunciation Failure.** On Wednesday May 24th the ODH system annunciated a fault when the EVS dampers in the LINAC failed open due to a loss of instrument air pressure (a leak in the klystron building took down the entire system). This damper open fault is annunciated when the LINAC is in beam permit mode. When the damper fault was investigated, it was discovered that a communication fault between the control room ODH rack and the ODH rack in the klystron building was affecting communication between the two racks. The ODH rack in the control room is used to inform operators of the status of the LINAC ODH system while the klystron rack provides the monitoring and alarm function for the LINAC tunnel.

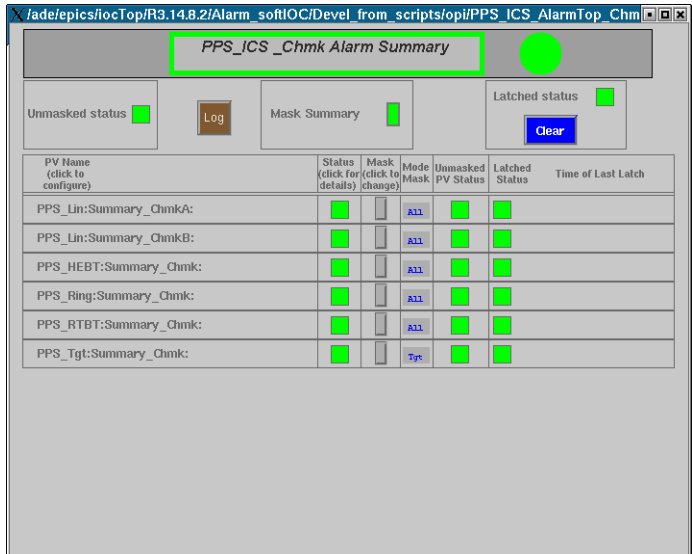
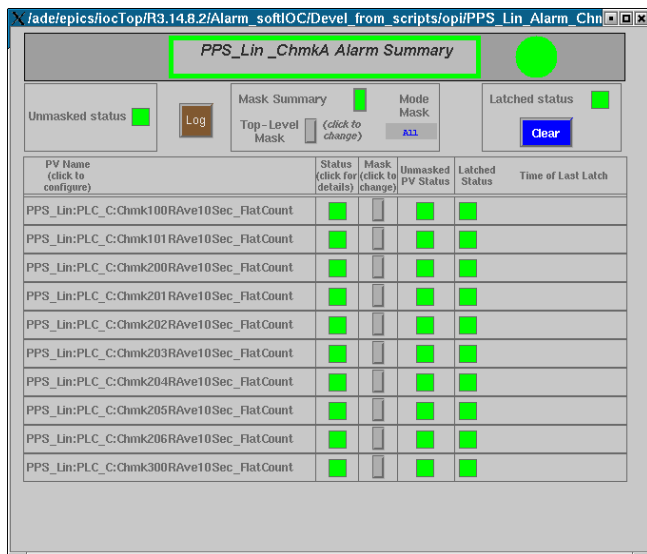
- Troubleshooting commenced the next day (a scheduled maintenance day). While troubleshooting was being conducted, all personnel that entered the LINAC or HEBT tunnels were required to wear a personal oxygen monitor.
- It was discovered that a communications error had developed in the ControlNet network between the two racks. Power cycling the klystron rack's ControlNet adapter re-established communications. The system was tested by exposing several oxygen sensors to a helium/ oxygen mixture to verify the alarm function and the system was returned to service Thursday afternoon.
- The communications fault alarm has been added to the EPICS alarm handler. An upgrade of the LINAC ODH system is planned for late summer. At that time, the ControlNet module's firmware will be upgraded to a newer version. The cause of the communication error has not been established, but the communication fault condition will be monitored via EPICS.
- **Front-End IOC2 "lock-ups."** Front End IOC2 had been failing intermittently for several weeks, and an upgrade was planned for the June shutdown. The IOC failed hard this week, however, so the upgrade was done, without complete testing, this week.
- First, the Alan-Bradley Driver was fixed to work with SNS07 Kernel. This in turn made it possible to upgrade the FE-CTL-IOC2 to SNS07. This has the better network stack that could handle the higher network traffic that was causing issues. An official tagged release is now running, and the IOC has not had problems since the software change on Tuesday night. The increased network traffic that was breaking the IOC was eventually tracked down to testing of the archiver utilizing ics-srv-archive2 that increased the network broadcast traffic.
- **SCL Vacuum lock-ups and RF trips.** The Hytec carrier card and all four IP cards were changed to clear error messages that the IOC was receiving. These error messages would eventually cause the IOC to lockup and require a reboot. These reboots in turn resulted in trips of many LLRF systems. After changing the Hytec hardware the error messages stopped. Reboots, and therefore RF trips, should therefore be less frequent, however the trips on reboot are still a problem. Scope measurements (see below) were taken during a reboot and determined that the IOC is sending something over the serial link that causes the high voltage to turn off on the MKS gauge controllers for ~ 40ms. This off period is enough to latch the interlock circuit on the AVIC card in the J-lab

Scope Traces on CCG09102 AVIC card



- Yellow : Voltage from MKS ~12V indicate HV is OFF.
 - Blue: MKS relay setpoint 1E-6Torr
 - Purple: latching circuit on AVIC card high = bad vacuum
 - Green: output to interlock LLRF Low = Turn off RF
- During a reboot a signal over the serial link is causing the high voltage to turn off for 40msec. Once HV is back on the latch fault has to be reset manually to clear LLRF interlock.

- chassis turning off the LLRF interlock. Something in the initialization is causing the MKS to turn off HV and this puzzle remains to be solved. (This phenomenon is new.)
- Alarm Handler work proceeded on several fronts. Troublesome channels on the target system alarm handler were identified and improved one-by-one. A demonstration was given of a new alarm handler architecture in which alarm conditions are “pushed” from IOCs to an alarm server, which then “pushes” messages to designated clients. This approach reduces network traffic and assures that new channels are included without prior configuration. Another new soft-IOC based alarm handler is ready for late-alpha or early-beta release. Doing alarm handling from a soft IOC makes it easier to integrate alarm status information into other EPICS applications, and to call EPICS displays from alarm screens. The alarm handler produces summaries and screens to collect alarms as specified in an ASCII text file listing the PVs and some specifications parameters. Sample screens are shown below.



- A new version of the power report that provides reports for netSwitches, IOCs, and power panels is available from the controls home page. Link to: <http://ics-web1.sns.ornl.gov:1982/reports2/> and select 'Power' from the list provided.
- Data from both the Cutler-Hammer PowerNet OPC server and the KEPCO UPS OPC server is now displayed on EPICS screens. Some data handling issues remain, but the easier access to power monitoring is long-awaited.
- There was much activity on the diagnostics front. Documentation started on the Harp electronics. Initial testing was completed on the evaluation board for the FastBLM DSP. More phase and magnitude measurements of HEBT BPM 25 – 30 cables were made and HEBT BPM 16 – 23 were recalibrated. The initial mechanical piece parts for building the 7 wire scanner actuators intended for June installation were received. Mechanical assembly is proceeding. Motor driver modifications have been made. Worked proceeded on new lens assembly and camera for the HEBT laser transport line, as well as on reinstallation of the LDRD (laser stripping) experiment.
- A presentation of LLRF control was made (via video) to a workshop at DESY.
- Continued analysis of archiver problems is identifying issues with channel access – the underlying EPICS communications protocol.
- We are displaying data from both the Cutler-Hammer PowerNet OPC server and the KEPCO UPS OPC server on EPICS screens. We still have a data type problem with the KEPCO Boolean to EPICS bi record to figure out, but the ai data appears to be transferring without a problem. The new server environment works well.

SRF Facility

Project Upgrade

Survey and Alignment

Linac

- Leveling was performed to transfer elevations from the exterior network into the Front End Building, in preparation for the Linac re-observation campaign during the June shutdown.
- Miscellaneous prep work was conducted on instruments and accessories in preparation for the re-observation campaign.

RTBT

- The attached graph covers the remote monitoring system for the interval May 3 – 25. The system installation was finished on April 21, but data wasn't being archived until May 3. The vertical scale is graduated in millimeters.
- The graph shows that the RTBT-Target interface has remained pretty stable both vertically and laterally (across beamline), but there has been significant motion in the longitudinal direction (along beamline). The graph shows that the distance between the RTBT slab and the Target slab has decreased by 0.35 millimeter since the monitoring system was installed. (Positive motion along the longitudinal axis is defined to be motion of the RTBT slab toward the Target slab.) This motion is clearly correlated with the air temperature changes in the RTBT tunnel.
- The longitudinal sensor is the least noisy of the three LVDTs. The readings from that sensor are so clean that we can very clearly see the 5-micron periodic changes caused by the heating/cooling of the LVDT amplifiers in the RTBT service building, as the air handlers run.

Target

- New monuments were installed on BL 17 and 18, and a survey network was built there. As part of the network campaign, the recently-installed neutron guides were mapped.
- The bulk shield liner flange fiducials on BL10 were located.
- The locations were marked for the placement of translation stage monuments for the remaining beam lines.

Drawing and Coordinate Data Base

- As personnel are available work continues on the upgrade of S & A integrated drawings and our coordinate data base.

- S & a also completed a drawing for the Diagnostics detailing the global position of their beam monitoring equipment.

Cryo Systems

Mechanical Systems

Water

Vacuum

Mechanical

Electrical Systems

Power Supplies

- Supported maintenance day activities with LOTO operations
- Repaired several PSIs for use as spares
- Replaced SCL_Mag:PS_QH11 due to internal water leak
- Wired and rewired HEBT_Mag:PS_QH12t18 for LDRD experiments
- Adjusted flow on RING_Mag:PS_QV3_5_7
- Ordered parts for extraction kicker noise reduction activities to be started in June.

Power Distribution/ cable installation

- PowerNet OPC server has been successfully installed at the CLO CER.
- Power monitoring cables that have been installed: RS1UP1 to RTBT Comm Rm and CE-EG1 to CE PLC cabinet. Cable for RI-1UPS1 to Ring Comm Rm is 90% complete.
- Prepared DCN for new circuit to milling machine in CLO D-G13.
- Reviewed lighting upgrade scope for machine lab CLO D-G13.
- Reviewed power/lighting/communications requirements for CLO 3rd floor buildout.
- Reviewed Target Building MCC as built drawings.
- Reviewed and approved DCN for BL 4A and 4B modifications.
- Reviewed CLO Auditorium lighting and Audio/Visual construction progress.
- Flow Transmitter Wiring for Front End
- Water Level Transmitter installation for Tower Cooling Water
- Power Monitoring Wiring for EPICS

Modulators

- Removed and replaced A phase IGBT assembly on RFQ modulator
- Modification of IGBT driver cards for pulse width adjustments
- Repaired IGBT Switch plate assemblies
- Repaired damaged Rowgowski coils

- Replaced modulator beacon lamps in Klystron gallery
- Troubleshooting/testing of Dynamic Fault Detection chassis in RFTH and on the bench
- Bids received on boost transformer coil redesign package. Subcontract administrator working on procurement package
- Purchase order placed for spare control chassis printed circuit boards
- Installation of HVPS in power supply lab to support development of alternative IGBT gate drive circuitry

Choppers

- Performed thermal calculations on the new LEBT chopper switch design
- Design work on alternative drive circuitry for the new LEBT chopper switches
- Removed spark gaps from existing choppers to allow for operation at higher voltages